

SEVENTH FRAMEWORK PROGRAMME

ICT and Ageing



D6.2a

Blue Print of Program

to extend Active Professional Life

Program actions, organization and strategic management of future RTD initiatives

D6.2a – Blue Print of Program to extend Active Professional Life**Edited by:** UNINOVA**Contributors:** UNINOVA: Luis M. Camarinha-Matos, A. Inês Oliveira, Filipa Ferrada
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Date: November 2009**Distribution level:** Public**Abstract:**

This report includes the set of proposed strategic research and technical development actions that, when successfully implemented, are foreseen to deliver a desirable future to the European society in terms of active ageing and the silver economy. In other words, this action plan will help achieving the ePAL vision, taking into account the current baseline and trends we have previously identified. The proposed actions are organized according to the three analysis perspectives - social, organizational and technological - which are followed throughout the ePAL project.

This version of the action plan takes into account the feedback received from the variety of stakeholders who participated at the various Consensus Building Events organized by the ePAL project.

Further to the specification of the ePAL roadmap actions, a time sequence and relative prioritization of these actions are also included in this report.

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1. INTRODUCTION

Many studies on demographic trends have been pointing out to the growing percentage of older and healthier people in Europe and worldwide. Challenges posed by an ageing society have been thoroughly discussed, particularly in terms of health and care needs and the associated social costs.

It is also a reality that many elderly citizens, following retirement, quickly become marginalized, and losing most of their social links, which leads to loneliness. Furthermore, considered as a cost burden rather than a resource that is capable of "value creation" in the society. And yet senior professionals hold important experience, wisdom, and talent assets that, under appropriate conditions, many of them would be willing to continue sharing through some form of socio-economic engagement.

More over recent studies show that active ageing, through a balanced combination of leisure, social interaction, and continued work involvement, is central to meeting citizen expectations and maintaining mental and physical health.

The critical challenge for the society in respect to the "active ageing / ageing well" process is to identify new organizational structures, approaches, and mechanisms to avoid the exclusion of elderly citizens from the market/society, and to create the possibility and chance to use their knowledge and expertise in making valued contributions. In addition to the traditional initiatives supporting elderly which are mostly focused on socializing and entertainment activities, a number of other organizational forms and mechanisms are emerging, focused on helping seniors in remaining professionally active, after their retirement.

ICT, and particularly high-speed pervasive broadband connectivity, offer new opportunities to materialize new ways of work, to facilitate social interaction, and to reduce basic limitations imposed by location and time, thus increasing personal control and creating more freedom.

Certainly a good number of ideas have been tried out in many research projects and pilot experiments on ICT and ageing (e.g. projects funded under EC FP5, FP6, and FP7 programmes). Some portfolios of results and lessons learned are already available. But many good ideas and promising pilot cases have also failed to scale, because the wrong priorities were chosen at the wrong time or a more holistic framework was missing. The sensitivity of this area, its dependency on the "parallel" introduction of new organizational models and creation of a new culture in society, the lessons learned so far with the existing associations of senior professional, the risk of continuously developing technology that is not taken-up by target users, among others are important characteristics to be considered. These characteristics suggest the need for a careful analysis and a new approach towards what concerns the new required supporting tools and developments for this area. In this context, roadmapping plays a fundamental role in the identification of a strategic research agenda as well as prioritization of its needed actions towards reaching a desirable future for active ageing.

Nevertheless, a mere technology-centred approach, without a comprehensive vision and consideration of the socio-organizational aspects is likely to, at best, add only marginal value. As identified through roadmapping steps, addressing the need for organizational and cultural changes is fundamental to ensuring that stakeholders are ready to face the challenges, and to embrace the new opportunities offered by technology. Without proper attention to organizational readiness we cannot realize the full benefit of the technology potentialⁱ. Therefore, the proposed plan of R&D actions is based on an ambitious vision for extending the active professional life and addressing not only the technological developments but also the socio-organizational aspects.

This report includes a revised plan of R&D actions that takes into account the extensive feedback received from multiple Consensus Building Events organized in different locations in Europe, by the ePAL consortium, and that involved more than 150 stakeholders in the active ageing area.

ⁱ Wilson, P.; Johnson, K.; Buller, W. (2008). Ageing well in a connected world: Smarter care, smarter participation. CISCO Internet Business Solutions Group, Dec 2008.

2. PROPOSED ACTIONS

The following sections introduce the proposed set of strategic R&D actions that resulted from the roadmapping process conducted inside the ePAL consortium and the extensive discussions with stakeholders through a number of Consensus Building Events.

Considering the need to address technological developments under a socio-organizational context, the proposed actions are grouped into three major areas: social perspective actions, organizational perspective actions, and finally technological perspective actions.

2.1 Social perspective

Proposed actions under the social perspective:

S1: Value identification and communication

Promote socio-economic studies that identify the unique value senior workers bring to the workplace (experience, compensation flexibility, etc.) as well as their motivation and value systems, investigate new ways of senior workers interacting with the socio-economic system and communicate findings to seniors, employers, unions and to the society as a whole.

S2: Leveraging skills and talents

Design/develop mechanisms for skills/talent identification, categorization and improvement that assess acquired experience, provide career transition advice and support skills-enhancement to maximize the potential of seniors.

S3: European Senior Space facilitation

Promote dialogue and consensus around issues of technology, culture and socio-economic participation, creating links between existing and emerging senior associations and groups to develop a single, powerful voice for senior professionals across Europe.

S4: Facilitating inter-generational interaction

Investigate the barriers and potentials for cross generational interaction and collaboration between senior professionals and younger people, and fund/promote programmes and technology development that support and facilitate this interaction/collaboration.

S5: Improving working practices

Investigate new models of working practices and related reward and taxation models for senior professionals, taking account of issues of work-life balance, aging well and gender, and promote the findings in order to positively influence societal perception of older workers.

S6: Developing training and awareness

Design / develop ICT and collaboration training programs for seniors, and promote awareness and usage of collaboration technologies.

Discussion:

S1: Value identification and communication

Promote socio-economic studies that identify the unique value senior workers bring to the workplace (experience, compensation flexibility, etc.) as well as their motivation and value systems,

investigate new ways of senior workers interacting with the socio-economic system and communicate findings to seniors, employers, unions and to the society as a whole.

Many older people want to work, learn and earn but are encountering difficulties in doing so. Main barriers include: actual or perceived age discrimination, especially by employers. Groups such as Age Concern in the UK have identified that many employers still hold negative preconceptions regarding the abilities of older workers and are thus reluctant to work with them. Many of these preconceptions are based on outdated notions of the abilities of senior workers. This is a waste of third age experience, skills and potential – in terms of the implications for individuals, local communities and the wider economy.

Research is needed into ways of overcoming negative preconceptions about the value of senior professionals and, moreover, identifying the specific and unique value they bring to the workforce. Investigation into schemes and employment models that provide opportunities for work trials, work sampling and work experience so that seniors can try out their skills, learn about unfamiliar occupations and prove themselves to employers would be highly beneficial. European governments have a role to play in ensuring that employers do not arbitrarily dismiss the worth of senior professionals to the European economy. Knowledge of what information campaigns and voluntary codes of practice for employers could help support the implementation of further anti age discrimination legislation is needed.

These concerns must be considered in the context of Industry complaints highlighted in the Effective Education for Employment reportⁱⁱ carried out by Edexcel concerning weaknesses in younger workforces. Employer complaints highlighted in this report regarding poor customer service, project management skills and business skills are often skills which are built up over a long career, those held by senior professionals.

S2: Leveraging skills and talents

Design/develop mechanisms for skills/talent identification, categorization and improvement that assess acquired experience, provide career transition advice and support skills-enhancement to maximize the potential of seniors.

Many seniors are now finding themselves working into retirement age without necessarily having planned to do so. It is therefore important that there is strong support to help them adjust to this new reality. At present there are many programmes concentrated on the reinsertion of unemployed seniors into the labour market but not enough to help those who are looking to make a smooth transition from full to part time work, in other words, an *extension* rather than a *renewal* of professional active life.

Better mechanisms need to be developed to measure the skills senior professionals bring from their previous employment: this would help to counteract negative assumptions concerning their abilities. These mechanisms should be formally accredited to give them more legitimacy. Skill assessments for senior professionals – including help in identifying existing and transferable skills, aptitudes and experience, and relating these to the current labour market - are vital.

More holistic help with such areas as personal branding, self advocacy and presentation – with a focus on techniques to overcome age stereotyping and hidden or overt discrimination - would be highly beneficial. The role of high-quality advice and guidance in helping many mid-life and older adults to work, learn and earn needs to be thoroughly investigated. The potential benefits for individuals, employers, government revenues and personal savings of such schemes are high.

ICT tools are needed that help automate classification/quantification of the experience that senior professionals bring into easily recognizable universal skill-sets that makes it easier for employers to judge the value this experience brings across industry sectors. This quantification of the transferable skills that senior professionals bring to the marketplace should be combined with new approaches to ICT training designed specifically for leveraging these skills. This would help ensure that regular retraining, according to labour market demands, covers all stages of a person's career. Such efforts

ⁱⁱ Playfoot Jim, Hall Ross, *Effective Education for Employment: A global perspective*, Copyright 2009 Edexcel

could serve to counteract negative preconceptions regarding the ability of seniors to learn new technologies and adapt to new working environments.

S3: European Senior Space facilitation

Promote dialogue and consensus around issues of technology, culture and socio-economic participation, creating links between existing and emerging senior associations and groups to develop a single, powerful voice for senior professionals across Europe.

Currently, European organisations that represent seniors (including associations of senior professionals) mostly recruit on a national basis. In order to fully leverage the weight of senior's voice across Europe – and in order to develop a coherent approach at European level – a network of Europe-wide seniors, supported by technology, could be launched to address issues at a pan-European level. New links need to be forged between existing associations of senior professionals to help ensure that seniors are able to provide peer group support – to extend networks, provide motivation and encouragement, support each other in achieving personal and collective objectives and help extend professional opportunities across national borders. For proper consensus on the debate around senior professionals, all regions must be able to take an equal part in the debate. Unfortunately, unless the current lack of access to proper broadband facilities in Eastern Europe changes, this situation may restrict many seniors from contributing to this debate, while language and socio-economic cultural differences make reaching across national borders a difficult task.

However, if a European Senior Space is to grow it must do so in a fair and all encompassing fashion. Social capital can be a negative force creating groups which restrict opportunities and support to those outside. Studies show that middle class males have very high levels of professional social capital that may well be excluding & restricting opportunities for female senior professionals. This is certainly true in the field of ICT with the e-accessibility conference in Bled (Slovenia) criticizing the industry for the lack of female representation at management level. Issues of inclusion must be addressed in the design and implementation of any Europe-wide senior network.ⁱⁱⁱ

S4: Facilitating inter-generational interaction

Investigate the barriers and potentials for cross generational interaction and collaboration between senior professionals and younger people, and fund/promote programmes and technology development that support and facilitate this interaction/collaboration.

Research is needed into how seniors can connect with SMEs and, specifically, younger individuals to help develop novel mechanisms for knowledge transfer and foment a greater understanding of what senior professionals can offer. Issues around technology access and accessibility need to be addressed as part of this research. In addition, models for advanced senior professional networks are needed to catalyse the development of better communication between senior professionals, their associations with SMEs and the younger generation.

Studies such as the Effective Education for Employment report^{iv} produced by Edexcel have highlighted a lack of soft skills in recent graduates entering the labour force. Creating better interaction between senior workers and those entering the workforce has the potential to address these shortages in a practical and cost effective way.

Given the relatively low membership of many senior associations in Europe, there is clearly a need to improve the effectiveness of collaborative networks. Building on and learning lessons from the success of online social networks could provide one mechanism for developing meaningful inter-generational interactions across national boundaries and could ensure a fuller participation of all societal groups, taking into account such issues as gender.

ⁱⁱⁱ Conference Report - Inclusion Ministerial Conference (Vienna, 30th November -2nd December 2008) available at <http://ec.europa.eu/einclusion>

^{iv} Playfoot Jim, Hall Ross, *Effective Education for Employment: A global perspective*, Copyright 2009 Edexcel

S5: Improving working practices

Investigate new models of working practices and related reward and taxation models for senior professionals, taking account of issues of work-life balance, aging well and gender, and promote the findings in order to positively influence societal perception of older workers.

As Europe's citizens increasingly work beyond retirement age, they develop new lifestyle and employment needs making many of the traditional employment models that predominate across Europe not ideally suited to the promotion of increased professional activity in senior workers. Labour models principally designed for younger workers cannot be seen as a one size fits all solution.

Research is needed to develop new employment models that better fit with the life dynamics of seniors whilst continuing to provide value for employers. Furthermore, greater emphasis is needed on helping employers recognize the benefits of adopting flexible working patterns that enable individuals to balance better aspects of work and life. These include promoting, among other things, flexi-time, staggered hours, shift swapping, job-sharing, and working from home with the intention of enhancing motivation and productivity, and extending working life through reducing work-related ill-health.

Studies are also needed into the changing financial needs of & work related benefits/incentives required by senior professionals. What are the financial benefits that would attract a senior professional to work for a business e.g. comprehensive health insurance schemes? By staying in work, some older workers continue to be covered by employer's health insurance which may also explain why some older workers in the US continue longer in employment. Schemes allowing pensioners to delay claiming a pension and then benefiting from a preferential tax rate when they do claim it as a lump sum would also be beneficial. Studies are also needed into understanding the important social benefits of work. A sense of purpose, stress reduction and social engagement regardless of gender are also important motivations when convincing senior professionals to extend their working life.

S6: Developing training and awareness

Design / develop ICT and collaboration training programs for seniors, and promote awareness and usage of collaboration technologies.

In a period of a rapidly changing technological environment, namely when ICT progresses at a very rapid pace, there should be a strong effort to make training programmes for raising awareness and usage of such technologies available. This is, especially important for senior citizens who are often highlighted as being more reluctant and having more difficulties in keeping up with technological change.

Indeed, the use of ICT tools is vital to keeping senior citizens active through collaborative working environments, mainly due to geographic dispersion of participants. Therefore, the promotion and creation of awareness for the usage of such collaboration technologies is a key factor. Although different working environments create different demands related to the way work is performed (i.e. focusing on voluntary or business perspectives), the necessity of using ICT collaboration tools is largely a constant.

In order to fully understand seniors' needs around the use of ICT, research is essential to determine the main requirements of ICT and collaboration training programs, how those programs should be focused on the needs of seniors and through what means they should be made available. Consequently, the design and development of such training programmes is mandatory.

2.2 Organizational perspective

Proposed actions under the organizational perspective:

O1: Enhancing policy and legislation

Identify and assess current national and European policy, legislation and incentives relevant to active participation of seniors in the socio-economic system and recommend new approaches that lower barriers and promote and support active aging.

O2: Keeping links

Investigate new mechanisms that forge mutually beneficial relationships between seniors and their former employers.

O3: Creating organizational structures

Investigate and promote new roles, governance rules and organizational forms for communities of active senior professionals to enhance inter- and intra-community collaboration and to create new opportunities for member engagement.

O4: Improving mediation and brokerage

Characterize and design new roles and modes of operation for intermediate organizations, both public and private, that provide brokerage and assistance to better facilitate integration and collaboration between senior professionals and the socio-economic system.

O5: Guiding career transition

Define new programmes and realistic practices that prepare for and guide the successful transition of senior professionals from full employment to active retirement, taking account of issues of gender, profession and local context.

O6: Meeting and creating market demand

Explore the best fit between capabilities of senior professionals and market demand and identify new channels to harness these resources and potentials in order to generate value and stimulate innovation amongst European businesses, thus supporting the economy.

Discussion:

O1: Enhancing policy and legislation

Identify and assess current national and European policy, legislation and incentives relevant to active participation of seniors in the socio-economic system and recommend new approaches that lower barriers and promote and support active aging.

To identify legislation best practices that allow senior professionals to combine their pension allowance with the maintenance and extension of their professional life and thus complementing their incomes in order to maintain a similar lifestyle to pre-retirement. Evaluate future sustainable pension systems and forms of legal extension of “silver economy” (including adequate taxation models for eventual additional income perceived by seniors).

An important issue is the adoption of more flexible policies, namely regarding taxation, allowing senior professionals to keep some professional activity, namely consultancy, after retirement. Flexibility in terms of the work modality is also necessary in order to smooth the transition from the pre-retirement to the retirement phases.

Considering that SMEs and start-ups are among the main potential beneficiaries of consulting and coaching services rendered by senior professionals, it is necessary to analyze which schemas of incentives can better promote the involvement of seniors in such activities. Complementarily it is also necessary to finding reasonable ways of guaranteeing that such involvement does not collide with principles of fair competition regarding other economic actors.

O2: Keeping links

Investigate new mechanisms that forge mutually beneficial relationships between seniors and their former employers.

To identify new systems and new types of intermediaries that help in reducing the current barriers to the involvement of seniors in the socio-economic system, identify mechanisms to help keeping relationships between seniors and their former employers, find smooth ways of transition between a pre- and post-retirement situation and investigate new structures and organizational models that favor the creation / maintenance of relationships between senior professionals and industry (companies, associations, financial entities, etc).

The existence of global policies to encourage the involvement of senior professionals in economic activities will be an important factor to facilitate the transfer and interchange of knowledge and experience of these professionals into the global market.

New forms of intermediate organizations providing highly efficient brokerage will help seniors engage with businesses in Europe. New models of interaction between senior professionals and younger workers, that must favour the collaboration between them in some areas such as training and in economic sectors such as industry, associations, financial entities, etc, reducing the time and training costs and increasing their efficiencies, is one of the main areas in which it is necessary further research.

Global regulations and policies will need to be changed in order to encourage the involvement of businesses in collaboration with senior professionals. Furthermore, consultancy, intermediate organizations, and senior professional organizations, should receive financial support and subsidies for their participation in public and private projects supporting active ageing. There should be significant long-term funding – from both public and private sectors - and the political drive to support new forms of senior associations and other intermediate brokers.

O3: Creating organizational structures

Investigate and promote new roles, governance rules and organizational forms for communities of active senior professionals to enhance inter- and intra-community collaboration and to create new opportunities for member engagement.

Analyze and promote new operating rules for the existing organizations of senior professionals, identify and establish new roles for seniors associations and senior professionals, leading to an increment of their activity level as well as the engagement of new members. Identify new organizational forms that favour the creation of new relationships between their members and the different types of stakeholders in the socio-economic system.

The use of senior professionals' experience and knowledge can be an important contribution to generate value in the beneficiary entities and support innovation in the global market via coaching activities oriented to entrepreneurs. It is however necessary to support the retraining of this professional group in order to facilitate a better linkage between their knowledge and background and the use of technology in order to implement their ideas. The special characteristics of senior professionals must be well understood and properly used, through the definition and implementation of adequate mechanisms to facilitate mature consulting and coaching activities towards young actors of innovation in all Europe.

Moreover it must be taken into account that new organizational cultures, supported by new organizational forms and proper regulatory frameworks, will positively embrace relationships between senior professionals and pre-retired (active) professionals.

O4: Improving mediation and brokerage

Characterize and design new roles and modes of operation for intermediate organizations, both public and private, that provide brokerage and assistance to better facilitate integration and collaboration between senior professionals and the socio-economic system.

Since existing organizations (e.g. regional development agencies, business innovation centres, etc.) do not properly consider the needs and specificities of senior professionals and do not effectively put

in contact potential clients with the senior professional that can provide services, it is necessary to analyze and define new roles for the existing organizations and develop new forms of intermediaries. A particular focus needs to be put on the development of new forms of intermediate organizations that can provide highly efficient brokerage to help seniors engage with businesses.

Complementarily, better use of some existing intermediate professional channels such as innovation business centres, local development agencies, etc., will favour the relationships between beneficiary entities and senior professionals, leading to emergence of new roles on the existing organizations as well as new forms of intermediation. In this area it is critical to design new forms of intermediation that allow a better connection between necessities of the business world and the capabilities of seniors professionals. Putting into practice such new forms and new roles will require significant funding – from both public and private sectors - and as well as a clear political drive in this direction.

O5: Guiding career transition

Define new programmes and realistic practices that prepare for and guide the successful transition of senior professionals from full employment to active retirement, taking account of issues of gender, profession and local context.

At this moment retirement is not a smooth process but rather an abrupt step which makes this transition in people's life a difficult one. It is thus necessary to properly address issues such as the necessary training for the transition, and the associated psychological, cultural and social aspects, in order to guarantee a successful transition. In other words, it is necessary to consider a "life course" perspective.

The preparation for this transition requires research attention in several areas. Especially seniors need to have access to the relevant services, including focused training, which they need to facilitate their transition between their working life and retirement to continue their active professional life in combination with leisure activities at the level that they wish. This transition process also needs to take into account the differences and constraints due to gender, sector of activity, and local context.

Although main actors in this process should be the public administrations and private companies that employ these professionals, it is also important to analyze the role that can be played by the associations of senior professionals.

O6: Meeting and creating market demand

Explore the best fit between capabilities of senior professionals and market demand and identify new channels to harness these resources and potentials in order to generate value and stimulate innovation amongst European businesses, thus supporting the economy.

As realized, it is difficult to identify new *markets* in which senior professionals could maintain their active life. Thus, it is necessary to identify new roles that can be played by senior professionals, new areas of activity which can fit their characteristics and knowledge, as well as to investigate and develop the necessary mechanisms so that these activities generate value in the socio-economic system.

Particularly in times of economic crisis, when there is a competition for jobs and a high unemployment among young people, it is critical to find new ways in which all sectors of the society can have a positive contribution. The knowledge and skills of seniors certainly need to be harnessed to generate wealth and stimulate innovation amongst European businesses. The characteristics that seniors professionals present both in terms of work and retribution flexibility, joined with their knowledge and experience, namely in areas for which new generations are not trained, e.g. soft skills, managerial skills, make it worthwhile to investigate new forms and principles under which their knowledge can be used for a better future of the European society.

2.3 Technological perspective

Proposed actions under the technological perspective:

T1: Developing conceptual models

Establish formal conceptual models for people's professional life cycle and the support environment for active ageing.

T1.1 - Establish a reference model for extension of professional active life and active ageing.

T1.2 - Elaborate common ontologies for communities of senior professionals.

T1.3 - Develop contractual and business models for communities of senior professionals.

T2: Generating adaptive solutions

Develop and integrate self-adaptive and configurable technology solutions in ICT collaboration environments facilitating technology acceptance and enabling customization for/by seniors.

T2.1 - Develop self-adaptive interface systems.

T2.2 - Develop self-customizable collaboration environments empowering seniors to better use ICT.

T2.3 - Develop technology assistance wizards.

T2.4 - Increase involvement of seniors in the design of new technologies for seniors.

T3: Building collaboration platforms

Develop open ICT collaboration platforms for communities of senior professionals that promote human interaction and socialization and are enhanced by affective computing, context awareness, and trust establishment.

T3.1 - Develop advanced functionalities and systems for management of communities of senior professionals.

T3.2 - Develop affections / emotions management systems for communities of senior professionals.

T3.3 - Design and support reference governance systems for communities of senior professionals.

T3.4 - Develop trust building management systems for communities of senior professionals.

T4: Building collaboration tools

Design and develop collaboration support tools and systems to facilitate value creation, considering the specific needs of senior professionals.

T4.1 - Develop marketing and brokerage support tools for communities of senior professionals.

T4.2 - Develop tools for virtual team creation, negotiation and e-contracting.

T4.3 - Develop tools for virtual team management and collaborative problem solving support.

T4.4 - Develop models and tools for management of Intellectual Property and performance.

T5: Leveraging legacy

Develop environments that empower seniors to leave a legacy capitalizing on their valuable and transferable personal / professional experience.

T5.1 - Define conceptual models of talents and develop user-centred knowledge acquisition tools (e.g. Domain Specific Languages).

T5.2 - Create reward mechanisms (system of incentives) to attract user-generated knowledge.

T5.3 - Develop knowledge assets assessment and intellectual property models.

T5.4 - Mechanisms to promote inter-generational inheritance.

T6: Elaborating behavioural models

Develop approaches that discover patterns and model "the evolution of senior professionals' interests and their involvement in the socio-economic system" and "the behaviour and emotional health of senior professional networks".

T6.1 - Develop a conceptual base for behavioural modelling.

T6.2 - Develop data-mining / machine learning approaches for behavioural patterns discovery.

T6.3 - Develop forecasts and simulation methods and tools for behavioural analysis.

T6.4 - Develop models and tools for emotional health management.

Discussion:**T1: Developing conceptual models**

Establish formal conceptual models for people's professional life cycle and the support environment for active ageing.

Conceptual modelling is a well known technique of data modelling, together with logical modelling and physical modelling. A conceptual model may include a description of the meaning of terms and concepts used by domain experts to discuss the problem, and to find the inter-relationships between different concepts. It attempts to clarify the meaning of various usually ambiguous terms, and ensure that problems with different interpretations of the terms and concepts cannot occur. Once the domain concepts in an environment have been modelled, the model becomes a stable basis for subsequent development of applications in the domain. The conceptual model is explicitly chosen to be independent of implementation details, such as concurrency or data storage.

There is a lack of comprehensive understanding and a suitable formal conceptual model to represent and support people's professional life cycle and thus it is essential to establish a reference model for the regulation of active ageing and extension of professionals' active life, along with the elaboration of a common ontology for the senior professional communities. Other components are the development of contractual models and business models for the communities of senior professionals. As such, in relation to development of required formal conceptual models the following research and development of required models need to be further addressed:

- (1) Development of conceptual models to support the design and implementation of collaboration support services, including services supporting (virtual) teams' formation and management as well as "user friendly interfaces" for senior professionals
- (2) Discovery and management of collaboration ontology that supports a variety of stakeholders in communities of active senior professionals as well as in the configured teams of senior professionals
- (3) Design of templates for novel cooperation contracts and agreements, as well as designing models and support environments for the implementation of negotiation processes among actors
- (4) Development of models to guide the implementation of advanced marketing and brokerage services
- (5) Designing new networking models for elderly communities' involvement with the socio-economic system.

T1.1 - Establish a reference model for extension of professional active life and active ageing.

There is a lack of comprehensive understanding and a suitable formal conceptual model to represent and support people's professional life cycle. On the basis of existing reference models for collaborative networks such as ARCON [3], it is essential to establish a reference model to act as the abstraction template for regulating and developing more specific models in the given domain of active ageing and extension of professionals' active life.

T1.2 - Elaborate common ontologies for communities of senior professionals.

Similar to other forms of collaborative networks, communities of active senior professionals may constitute large number of members who originate from different professional disciplines in which the usage, understanding as well as the specification of terms and concepts could be different. To unify the usage and specification of terms and concepts among senior professionals in these communities there is a need to define and elaborate common ontologies, specifying the representational vocabulary of the domain.

T1.3 - Develop contractual and business models for communities of senior professionals.

To enhance the speed and effectiveness of reaching agreements in communities of active senior professionals there is a need for designing business models and the support frameworks for the implementation of the negotiation processes among actors, as well as designing templates for cooperation contracts. Furthermore, new business models that take into account the specific working conditions of seniors and the social security and other legal constraints (e.g. taxation laws) need to be developed.

T2: Generating adaptive solutions

Develop and integrate self-adaptive and configurable technology solutions in ICT collaboration environments facilitating technology acceptance and enabling customization for/by seniors.

Because there are some seniors that may require special training and assistance when dealing with technology, it is necessary to have self-customizable collaboration environments that empower seniors to better use the ICT solutions. Here, several solutions may be developed, such as: self-adaptive interface systems and technology assistance wizards. To deal with emerging technologies, seniors should also have access to several training approaches. Therefore, in relation to this topic further research is needed to address the development of “Configure yourself “based philosophy infrastructure, and easily adaptable and customizable user interfaces.

The technology solutions (e.g. software systems) that are self adaptive and configurable evaluate their own behaviour and change behaviour when their evaluation results indicate that they do not accomplish what they were intended to do, or when better functionality or performance is possible [1] [2]. Thus the technology solution modifies its behaviour in response to changes in its operating environment – e.g. end user input, external hardware device and sensors, etc. This implies that the technology solution has multiple ways of accomplishing its purpose, and has enough knowledge of its own construction to make effective changes at runtime. Systems built in this way should therefore include functionality for evaluating their behaviour and performance, as well as the ability to re-plan and reconfigure their own operations in order to improve their operation. Self adaptive technology solution should also include a set of components for each major function, along with descriptions of these components, so that components of systems can be selected and scheduled at runtime. It also requires the ability to match changing input/output of sequenced components, and the ability to generate some of this code from the specifications.

T2.1 - Develop self-adaptive interface systems.

Systems supporting senior professionals must provide their basic functionalities in a synthetic and adaptive way to suit this community. Namely, it is necessary to build system interfaces which are adaptable to different senior user’s perceptions, to the extent possible. An essential characteristic of self-adaptive interfaces for senior professionals is the ability of the interface to evolve itself in order to match different available computing environment (e.g. at senior’s residence) as well as different users’ profiles and behaviours. These systems need to be specifically designed and developed.

T2.2 - Develop self-customizable collaboration environments empowering seniors to better use ICT.

Self-customizable systems have the potential to change themselves to the evolving user requirements and to their changing environment. One way to address this challenge is through automatic component composition, namely, through systematically (re-)building systems, according to different existing requirements, through composing pre-existing reusable components. Approaches and mechanisms supporting the development of reusable components that address specific seniors’ user requirements need to be researched and developed.

T2.3 - Develop technology assistance wizards.

In addition to training, and considering the growing complexity of ICT systems, it is critical to accompany the development of new systems with the design and implementation of technology assistance wizards that guide (senior) users through their use and understanding of the underlying concepts.

T2.4 – Increase involvement of seniors in the design of new technologies for seniors.

Considering the special motivation and the level of understanding of the needs of seniors, it is highly desirable to increase the involvement of seniors in the specification and design of technologies and tools specifically oriented to cope with older people needs.

T3: Building collaboration platforms

Develop open ICT collaboration platforms for communities of senior professionals that promote human interaction and socialization and are enhanced by affective computing, context awareness, and trust establishment.

ICT collaboration platform is a unified electronic platform that shall support synchronous and asynchronous communication within a network through a variety of devices and channels. It offers a set of software components and services that enable actors to find each other and the information they need, and to be able to communicate, interoperate, and work together to achieve common

business goals. The core elements of a ICT collaboration platform include messaging (email, calendar scheduling, contacts, etc.), team collaboration (activity coordination, file synchronization, ideas and notes in a wiki, task management, full-text search, etc.), real-time collaboration and communication (e.g., presence, instant messaging, web conferencing, application / desktop sharing, voice, audio and video conferencing), and Social Computing tools (e.g., blog, wiki, tagging, RSS, shared bookmarks). Effective communities of senior professionals need to be supported by an appropriate ICT collaboration platform. Such platform, besides governance systems of the community, should also provide an advanced management system, and a trust building management system, supported by an affections / emotions –based management system. Furthermore, to realize a proper ICT collaboration platform for senior professionals, further research needs to be performed addressing the following:

- (1) Development of advanced collaboration support services, including (virtual) teams' formation and management
- (2) Development of affective computing and context aware enriched environments
- (3) Formulation of mechanisms and development of systems supporting the establishment of trust among stakeholders
- (4) Provision of security and ethical / privacy support.

T3.1 - Develop advanced functionalities and systems for management of communities of senior professionals.

Specific functionalities are required to support different collaboration tasks and activities performed by senior professionals. Management of heterogeneous information as well as the handling of diverse business processes within the communities of active senior professionals, need to be researched and supported through advanced collaboration infrastructures. It is required to establish the base ICT infrastructure to support senior communities with their networking, interaction, inter-operation and co-working. Therefore, advanced management systems (e.g. including the management of community members and their competencies) that meet all specific requirements of these new forms of collaborative networks need to be developed.

T3.2 - Develop affections / emotions management systems for communities of senior professionals.

The process of designing systems and tools that shall support senior professionals in collaborative community environments must take into account the social and affective aspects related to seniors when interacting with computers and with each other online. Some few examples related to these aspects include managing online individual identities, adapting to the specific needs of the individuals on both ends, matching organizations and professionals, overcoming challenges in online communications, fostering feelings of inclusion and value, and establishing and using trust in technology, trust in each other, and trust in one's own ability to contribute. Emotions can play an essential role in decision making, individual perception, learning process, personal interests, etc., and influence rational thinking of an individual. These social and affective aspects need to be properly addressed in research and development with thorough consideration of specific related requirements of senior professionals.

T3.3 – Design and support reference governance systems for communities of senior professionals.

Active senior professionals collaborative environments have some unique features and characteristics and thus further research is needed to either support tuning of the existing management system to match requirements of these communities, or to develop their own specific systems required to regulate their working and sharing principles and establishing the federation or some governing hierarchies.

T3.4 - Develop trust building management systems for communities of senior professionals.

To properly analyze, measure, and establish rational trust among partners in collaborative senior professionals' environments, a number of aspects need to be addressed such as designing the required models and mechanisms for trust assessment, depending on different purposes for establishing trust. The designed models and mechanisms shall then be used for rational measurement of trust level in different stakeholders in the communities and the development of required trust management systems.

T4: Building collaboration tools

Design and develop collaboration support tools and systems to facilitate value creation, considering the specific needs of senior professionals.

Collaborative processes in networks, namely through co-working among partners, need to be supported by advanced ICT collaborative tools and services in order to effectively achieve the creation

of intended values. As such, strategies established to facilitate the operation of communities of active senior professionals need to be dynamic and aligned with the developments of ICT tools and competitively support them through enhancing time/cost effectiveness of their business climate. Furthermore, services are needed to support networks publicize their name and brokerage brand including the advertising, public relations, customer service efforts, etc. To enable such community members to co-perform their professional activities, ICT services and tools shall facilitate the following aspects that are in need of further research:

- (1) Advanced collaboration support services for formation of virtual teams
- (2) Advanced services for negotiation and e-contracting in virtual teams
- (3) Support for virtual team management and collaborative problem solving
- (4) Management of intellectual property and performance
- (5) Tools supporting the process of value creation
- (6) Advanced marketing and brokerage services
- (7) Security and ethical / privacy support services.

T4.1 – Develop marketing and brokerage support tools for communities of senior professionals.

Nowadays, locating opportunity advertisements (such as call for tenders), as well as bidding against the emerged opportunities can occur online. As a result, it is now necessary that every market actor makes the information related to his/her competencies, products he/she can offer to the market, etc., accessible online. To better facilitate value creation for seniors in the market, properly organized communities of active senior professionals can facilitate this task. Therefore, it is necessary to develop marketing and brokerage tools supporting the brokering stakeholders in these communities.

T4.2 - Develop tools for virtual team creation, negotiation and e-contracting.

One fundamental aspect of communities of active senior professionals' operation is related to effective and fluent creation of targeted virtual teams, comprising less setup costs and time. As such, tools shall be developed to facilitate the search and selection of most fit senior professionals as well as the processes related to their collaborative negotiation and contracting, to be conducted as efficiently as possible as required for quick response to the opportunities in the market/society. Developing tools that automate some of these processes or support their handling shall enhance the effectiveness of the process of creating virtual teams.

T4.3 - Develop tools for virtual team management and collaborative problem solving support.

To ensure that virtual teams meet the requirements of their customers, all processes required to run within the virtual teams need to be properly managed. With time the amount of information that needs to be collected and analyzed to support the management of virtual teams shall increase and requires proper classification and organized storage. Challenging opportunities emerged in the market/society require collaborative problem solving among a number of stakeholders. To facilitate these processes it is necessary to develop tools that will support the decomposition of these problems, as well as their resolution in a collaborative way. Machine learning and decision-making approaches need to be further researched to support this area.

T4.4 - Develop models and tools for management of Intellectual Property and performance.

Similar to other collaborative environments, seniors may also collaboratively develop new concepts or products that in turn will need careful assignment and management of their intellectual property right. Since communities of active senior professionals are unique in terms of their characteristics, it is necessary to develop specific models and tools capturing these rights, as well as the measurement of the performance of each stakeholder towards development of the joint results within the collaborative networks. Soft computing approaches provide the base for these studies.

T5: Leveraging legacy

Develop environments that empower seniors to leave a legacy capitalizing on their valuable and transferable personal / professional experience.

Senior professionals' involvement in societal and market activities is not only to provide more economic gains in the market and society but also to transfer the accumulated knowledge and experience to younger generations and other professionals. For the later process to be achieved, considering that the current working environments are mostly ICT-enabled, an ICT environment must be built to support empowering seniors, making them feel useful and needed by the society, as well as easing the process of transferring their knowledge to the intended recipients. As such, innovative mechanisms and tools need to be developed to facilitate the modelling and capturing of talents and

skills of senior professionals. Namely, these models can be used to develop services to support acquiring, storing and managing of knowledge assets from senior professionals. Therefore, for these aspects to be realized in communities of active senior professionals, further research is needed to address the following topics:

- (1) Development of tools supporting inheritance and sharing of user-generated knowledge assets
- (2) Design of new networking models providing incentive for involvement of elderly communities in the socio-economic system.

Furthermore, training and methodological support for using available technologies for content creation need to be developed.

T5.1 – Define conceptual models of talents and develop user-centred knowledge acquisition tools (e.g. Domain Specific Languages).

Novel mechanisms and tools shall be developed to facilitate the abstraction, modelling and capturing of specific “talents, knowhow, and skills” that the senior professionals own. These models shall then be used to develop services to support acquiring, storing and managing variety of knowledge assets from senior professionals and providing the inherited knowledge/wisdom pool in their professional communities.

T5.2 - Create reward mechanisms (system of incentives) to attract user-generated knowledge.

Senior professionals need to be motivated and in one way or another rewarded for contributing to the market/society. Therefore, a proper system of incentives (monetary or otherwise) needs to be established, and criteria shall be identified for deciding on the type and level of rewards that can be considered in communities of active senior professionals. This system shall create the atmosphere indicating that senior professionals are valued within the society for what they contribute.

T5.3 – Develop knowledge assets assessment and intellectual property models.

In order to assess the quality and conditions of use of the knowledge and experience of senior professionals, new tools are needed. Complementarily there is also a need for the development of new models and support tools to handle intellectual property and quantify the individual contributions to value creation in a collaborative context.

T5.4 - Mechanisms to promote inter-generational inheritance.

One focus of communities of active senior professionals is to transfer the accumulated knowledge and experience from the senior professionals to the younger generations and other professionals, as a fundamental inheritance. In order to make this process effective: mechanisms, tools and ICT environments must be designed and developed to support empowering seniors, and to make them feel useful and needed by the society, which in turn will also ease the process of transferring their knowledge/wisdom inheritance to the intended recipients.

T6: Elaborating behavioural models

Develop approaches that discover patterns and model “the evolution of senior professionals’ interests and their involvement in the socio-economic system” and “the behaviour and emotional health of senior professional networks”.

The explosive growth in personalized devices, social networks, and novel user interfaces is transforming our daily lives by changing the way we interact with each other and co-exist in society. In case of senior professionals, a deeper understanding of human behaviour is useful to discover the technology needs of the next generation of collaborative networks such as communities of active senior professionals. Namely, it is needed to explore the broad spectrum of discovering, measuring, modelling, and leveraging human patterns and behaviour, in order to develop better ICT infrastructure to support, sustain, and enhance these networks. The evolution of the behavioural patterns and emotional status of senior people when facing a transition from their previous fully active professional life to a retirement phase need to be better understood and properly modelled. Furthermore, the collective patterns and behaviours of involved participants in a network will represent the behaviour and emotional health of the respective network. Some promising areas of further research for this particular purpose is the development of a conceptual base for behavioural modelling, data-mining / machine learning approaches for behavioural patterns discovery, forecasts and simulation methods as well as tools for behavioural analysis, and the models and tools for networks emotional health management. In this direction of research, the following specific topics need to be addressed:

- (1) Development of easily adaptable and customizable user interfaces for acquisition of data for behavioural pattern analysis

- (2) Development of tools supporting affective computing and context aware enriched environments
- (3) Formulation of mechanisms and development of systems supporting the establishment of trust and social bonds among stakeholders
- (4) Design of new networking models for elderly communities' involvement with the socio-economic system.

T6.1 – Develop a conceptual base for behavioural modelling.

A thorough understanding of human behaviour in the pre- and post-retirement stages is needed to be established in order to analyze the requirements for developing on ICT supported environment for the next generation of collaborative networks for senior professionals. Namely, it is needed to explore the broad spectrum of discovering, measuring, modelling, and leveraging human behaviour patterns when using the ICT supported systems, in order to develop better ICT infrastructure to support, sustain, and enhance seniors' collaboration in these networks as well as to contribute to the individual's well-being.

T6.2 - Develop data-mining / machine learning approaches for behavioural patterns discovery.

Learning is necessary to be able to properly discover patterns of behaviour, for modelling and development of suitable tools and systems. Data mining and machine learning are two of the disciplines that can be applied to deal with challenges related to discovery of human behavioural patterns out of the experiential data collected through collaboration platforms. New approaches need to be developed in these disciplines to support the effective capturing of patterns of behaviour of senior professionals.

T6.3 - Develop forecasts and simulation methods and tools for behavioural analysis.

Both forecasting as the technique applied to predict the future, and simulation which provides better understanding of how the predicted future can emerge when given the available empirical or assumed data, can be applied to study and analyze behaviour of senior professionals within their collaboration networks. Although some forecasting and simulating of human behaviour is performed in past research, there is a lack of models and tools suitable to capture specific changes and evolution of behaviour in elderly. Furthermore, research is required on forecasting the behaviour of collaboration networks themselves, and to support managing group behaviours in communities of active senior professionals.

T6.4 - Develop models and tools for emotional health management.

The collective patterns and behaviours of involved senior professionals will represent the behaviour and emotional health of their respective collaborative communities. Thus models and tools need to be developed to support capturing the emotions of individual senior professionals, and to analyze the collective behaviour of all members together, in order to indicate the emotional health of the collaborative networks as whole. Furthermore, tools can be developed to enhance the health of communities of active senior professionals, e.g. through mediation or by applying self-healing.

3. SCHEDULING OF ACTIONS

The following diagrams show the proposed time sequence for the implementation of the actions proposed by the ePAL roadmap for the social, organizational, and technological perspectives.

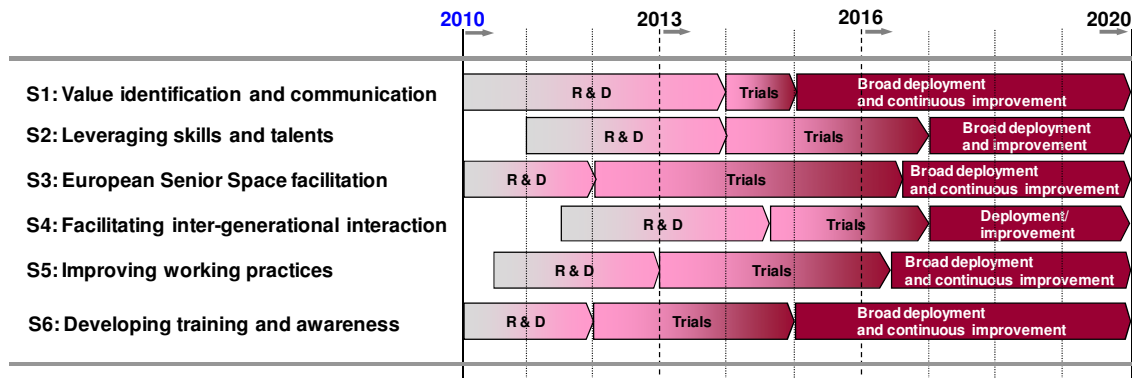


Fig. 1 – Time sequence for ePAL roadmap actions under the social perspective

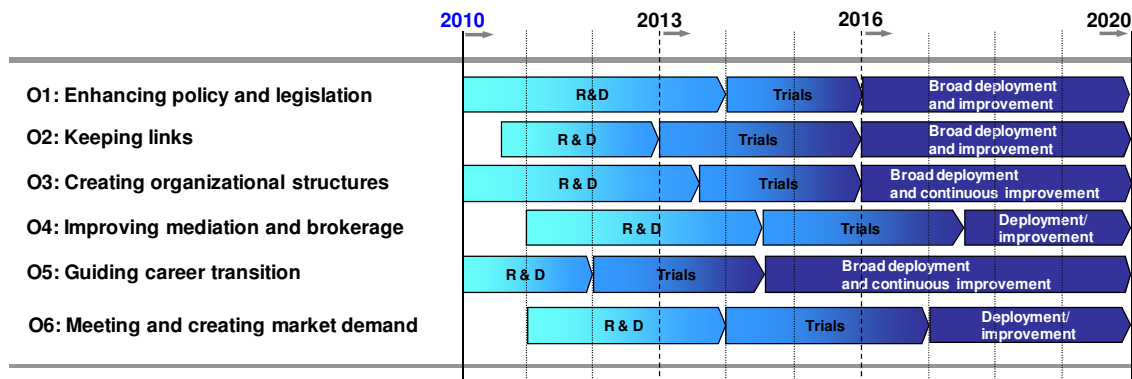


Fig. 2 – Time sequence for ePAL roadmap actions under the organizational perspective

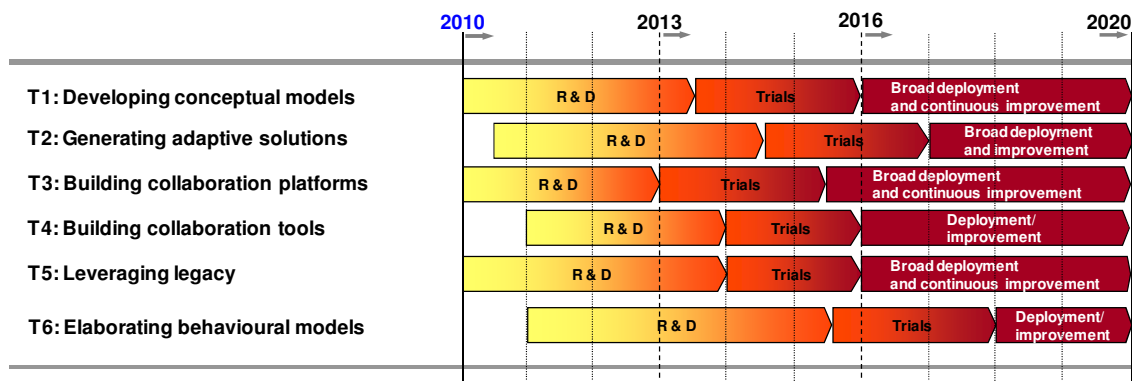


Fig. 3 – Time sequence for ePAL roadmap actions under the technological perspective

In each of the above diagrams and in relation to each action (i.e. S1 to S6, O1 to O6 and T1 to T6), the following three modalities of implementation are considered as represented in the time sequences:

- R&D – focusing on the required fundamental research as well as the development of prototypes and proof of concepts, aimed to address challenges and provide solution approaches and mechanisms.
- Trials – oriented towards development of pilots and validation scenarios in practice that allow the verification and refinement of the R&D results with the objective of facilitating the use of such results and development of innovative products and services.
- Broad deployment and continuous improvement – aiming at large scale adoption and validation – large pilot initiatives – of new technologies and services, as a mechanism to facilitate their wide take-up by the society.

Considering current programs of the European Commission, these modalities reasonably match respectively the FP7 research program, the AAL initiative, and the CIP program.



4. RELATIVE IMPORTANCE OF ACTIONS

Based on the preferences expressed through voting by the participating stakeholders during the Consensus Building Events organized by ePAL, the different actions related to each perspective are prioritized. The following diagrams show these suggested relative prioritization of the planned actions:

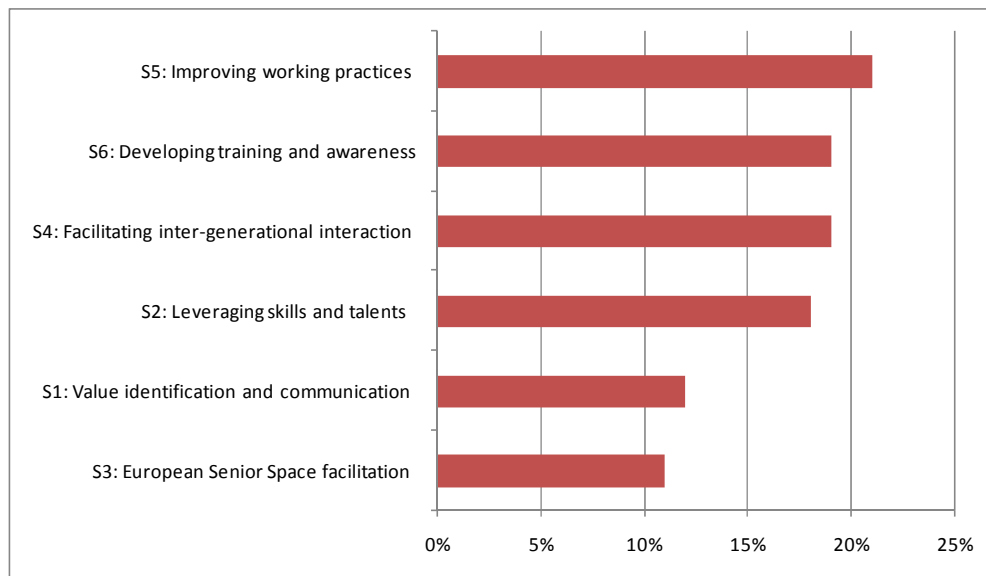


Fig. 4 – Priorities of actions under the social perspective

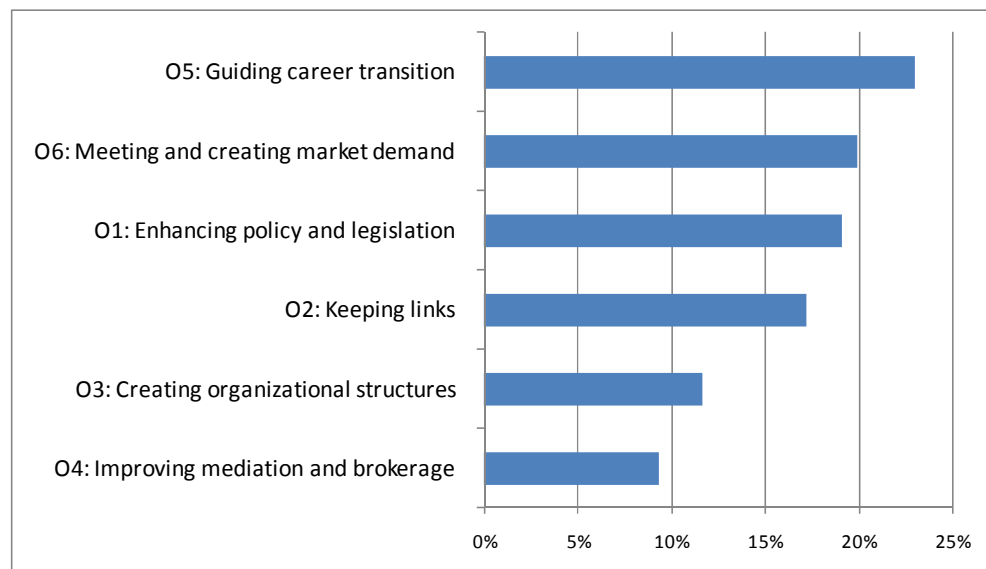


Fig. 5 – Priorities of actions under the organizational perspective

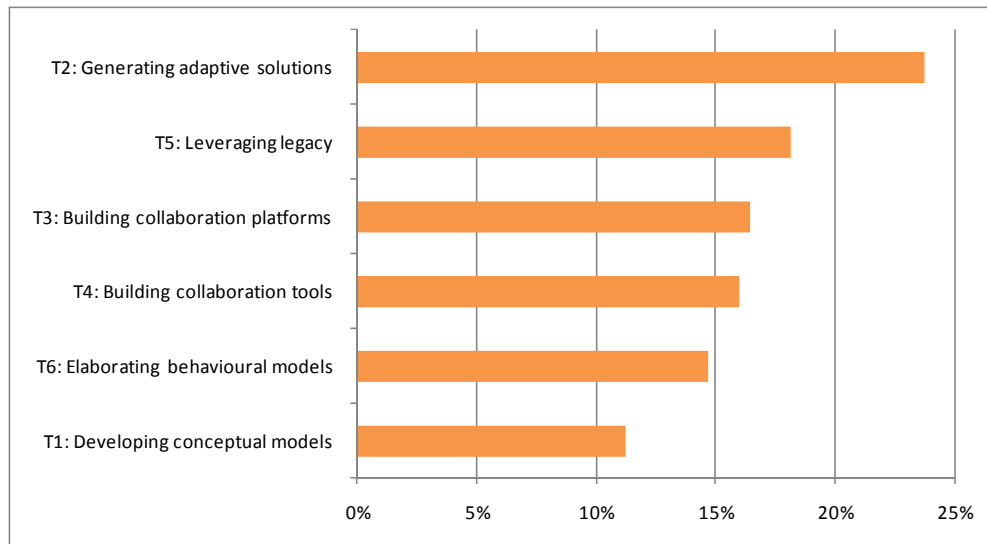


Fig. 6 – Priorities of actions under the technological perspective



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